A Letter of Mr. John Conyers, *Citizen of* London; *the Author of the Hygroſcope deſcribed in* Numb. 129; *in which Letter is contained a Draught and Deſcription of a very uſeful and cheap* Pump, *contrived by the ſaid Mr.* Conyers; *a Trial of which was alſo made at the Repairing of the New Canal of Fleet-river in* London, *and elſewhere.*

SIR,

I Have here incloſed a Draught of a very uſeful and cheap Pump, which about the Year 1673 was by me contrived, and by my direction uſed and made at the New Canal of Fleet-river in *London* at the Work there, when the River was lately enlarged as now it is; and this Pump was then found to empty and raiſe at leaſt twice as much Water proportionably as thoſe of the ſame or rather bigger bore, that were firſt made uſe of and caſt by; for, *this* being Taper or Conical all the way, and *thoſe* Cylindrical, *this* would raiſe and caſt out twice as much Water at leaſt at one ſtroke, as the other Cylindrical ones would do with the ſame bore and ſtrength. Now you may diſcern by the faſhion, that, as there is no Braſs or Lead work here, ſo it will be purchaſed at a cheaper rate than uſual; and as there is liberty in the motion, ſo there will be no wearing or rubbing upon the ſides of the Bucket: Beſides this, you may with the ſame eaſe by which you caſt out of a cylindrical bore, caſt out twice as much at leaſt out of this: So that how uſeful this may prove for draining of Low grounds, Pitts, Mines, Fiſh-ponds, and for Shipping, Time and Experience muſt diſcover. This Engin was then recommended by Dr. *Francis Gliſſon*, as alſo by Dr. *Jonathan Goddard* to the *Royal Society*, whilſt it was uſed in the Canal aboveſaid.

Now this being the largeſt yet made about nine foot in length, and the ſmaller end or bottom-bore eight inches, and the top one foot eight inches bore, it was found to caſt out at leaſt eight Gallons at one ſtroke; and this was a Bore of a ſquared faſhion, being made of Planks nailed together, and Iron-hoops added to ſtrengthen it on the outſide; which alſo in proportion may be made to what length or breadth you pleaſe. Now, though the Bore be large at the top, there is no more weight of water that lies on the bore at bottom, than juſt the breadth there; the reſt is born up by the ſides, and the impulſe of Water by that means is made in the water without grating againſt

The Royal Society is collaborating with JSTOR to digitize, preserve, and extend access to *Philosophical Transactions (1665-1678).* www.jstor.org

gainſt the ſides of the Veſſel; and ſo with much greater eaſe and ſwiftneſs. The Water in the ſame time is raiſed through a ſmaller paſſage, to anſwer an enlarging capacity from the top to be vented according to that large proviſion for delivery; and it ſhews, that Water moves eaſieſt in Water, and requires a conical or tapering liberty throughout for its largeſt disburſment in quantity and eaſe in that motion, and the differing ſwiftneſs makes amends for the difference of the bore; for it moves three times as faſt through the ſmaller bore in the ſame time, in anſwer to the delivery of the larger bore at the top.

It is to be obſerved, that no ſtrength is loſt in this motion, the lateral rubbings being prevented thereby, and this being the moſt genuine figure for the largeſt quantity of fluids to move in, raiſing the Water ſooner and with greateſt eaſe.

Explanation of Figure I.

AA the body of the Pump, made of *Oak*, *Elm*, or *Deal*-planks; with a valve at bottom *a a*.

BB the Bucket, in the midſt of which there is a valve *b*, not viſible in the Figure, being concealed by the ſides of the Leather *b b*.

CCC the Iron to raiſe the Bucket.

DD the wood at the bottom of the Bucket containing the Valve.

EE the handle for raiſing the Bucket, to be managed by fewer hands than ordinary Pumps are; which may be altered ſo as to employ a Horſe, or Mill, or other ſuch like way more advantagious than that of this handle, managed by the ſtrength of Men.

FF a ſquare taper-Box, with holes in the ſides, and open at the bottom; into the narrower part of which is incloſed the narrower end of the body of the Pump.

GG an additional Bucket of a larger dimenſion, to be placed in the Iron-work of the Pump about H, when it ſhall be needful to lengthen the Taper of your Pump, and thereby to raiſe the Water more forcibly to a greater height.

I I the Spout of the Pump, to caſt out the water of the ſame breadth with the ſide of the Pump, at the place repreſented by the Figure.

KK the Iron or Wooden-work ſet off, or bent back (if need be,) and placed at the back of this Pump for the eaſier and more capacious motion of the Pump-handle, in which it moves.

It may not be amiſs to mention here, that this Pump, which was uſed at the ſaid New Canal, was eight foot and a half long, and one foot eight inches broad at the top, and about eight inches broad at the bottom where it is inſerted in the Box, and did caſt out eight Gallons at a ſtroke, and twenty one ſtrokes being made in one minute, there was delivered about 169 Gallons in a minutes time; whence 'tis eaſie to compute, what quantity is thrown out in an hour.

If it be asked, why the Pump and the Bucket is not of the ſame breadth throughout as high as the Bucket moveth? I anſwer, that it cannot be allowed of any other faſhion than a tapering one, becauſe that the celerity of the motion in the narroweſt part of the Pump would thereby be obſtructed in its ſupplying the delivery of the Water, which is thereby provided for the evacuation anſwering to the bigneſs of the uppermoſt broader part of the Pump.

Note, that this kind of Pump may by the ſame contrivance be made of a Tree bored through with a Taper-bore; and a Basket may be uſed at the bottom of the Pump inſtead of the Box-Colender.

Some Conſiderations of an obſerving perſon in the Country upon Numb. 133. *of theſe Tracts, ſent in a Letter to the Publiſher of* May 2, 1677.

SIR,

YOur Tract of *Numb.* 133. is very pleaſing for the great variety of good Arguments, ſome very curious, ſome very uſeful, all very conſiderable.

1. Your Preface is brief and modeſt. And never were noble Travellers better furniſht with learned and accurate Inſtructions, and with exact and compleat Exemplars, as appears in ſeveral of your Breviates. In the *firſt* Volume you ſuggeſt ſome of the moſt remarkable *Inquiries* for many foreign Countries: You begin with Artificial Inſtruments, *N.* 1. *p.* 31; more particularly for the Sea, *N.* 8. *p.* 140, further explain'd *N.* 24; and with an Inſtrument for drawing any Object in perſpective, *N.* 45. And now Mr. *Moxon*, Mr. *Seller*, Mr. *Green*, Mr. *Morden* and others are abundantly furniſhed with Sea-plots for all Navigations, Projections, Mathematical Books and Mathematical Inſtruments for all occaſions of Travellers by Sea or Land. Neither *Anacharſis*, nor *Democritus*, *Pythagoras*, nor *Apollonius Thya-*

Fig. II.

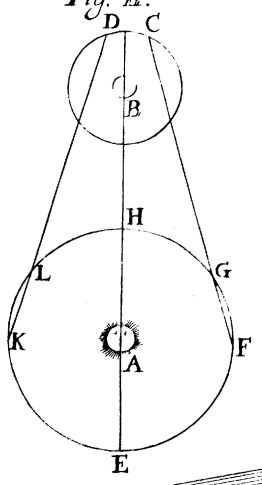

Fig. I.